PRIUS D

CE Ex II 2G Ex h IIC T3, T4 Gb

CE Ex II 2D Ex h IIIC T120°C Db

EN

OPERATING MANUAL

ATEX

MOTOR DRIVEN DIAPHRAGM METERING PUMP

SPRING RETURN MECHANISM

THIS OPERATING INSTRUCTIONS CONTAINS SAFETY INFORMATION THAT IF IGNORED CAN ENDANGER LIFE OR RESULT IN SERIOUS INJURY.

READ THESE INSTRUCTIONS **CAREFULLY** BEFORE USE AND KEEP THEM FOR FUTURE REFERENCE.
ORIGINAL INSTRUCTION.
INFORMATION AND SPECIFICATIONS ON THIS MANUAL COULD BE UNCORRECT OR COULD HAVE PRINTING ERRORS.
SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Version: R2-09-19

NORME CE
EC RULES (STANDARD EC)
NORMAS DE LA CE

Direttiva Bassa Tensione
Low Voltage Directive
Directiva de baja tensión
} **2014/35/UE**

Direttiva EMC Compatibilità Elettromagnetica
EMC electromagnetic compatibility directive
EMC directiva de compatibilidad electromagnética
} **2014/30/UE**

Norme armonizzate europee nell'ambito della direttiva
European harmonized standards underdirective
Las normas europeas armonizadas conforme a la directiva
} **2006/42/CE**

Direttiva ATEX
ATEX Directive
Directiva ATEX
} **2014/34/UE**

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GENERAL SAFETY GUIDELINES

Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment.

ICON

This manual use the following safety message icon:

Danger!
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Warning!
Indicates a hazardous situation which, if not avoided, could result in death or serious injury

Important - A practice not related to personal injury or additional information.

METERING PUMP IS INTENDED FOR CHEMICAL DOSING.

Use of this pump with radioactive chemicals is forbidden!

Keep the pump protected from sun and water. Avoid water splashes.

In emergencies the pump should be switched off immediately! Disconnect the power cable from the power supply!

When using pump with aggressive chemicals observe the regulations concerning the transport and storage of aggressive fluids!

When installing always observe national regulations!

Manufacturer is not liable for any unauthorized use or misuse of this product that may cause injury, damage to persons or materials.

Pump must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!

Feeder should be interlocked with a no-flow protection device.

Pump and accessories must be serviced and repaired by qualified and authorized personnel only!

Before any operation:
- **always read chemical Material Safety Data Sheet (MSDS);**
- **always wear protective clothing;**
- **always discharge the liquid end before servicing the pump!**
- **empty and rinse the liquid end before work on a pump which has been used with hazardous or unknown chemicals!**

1. DESCRIPTION

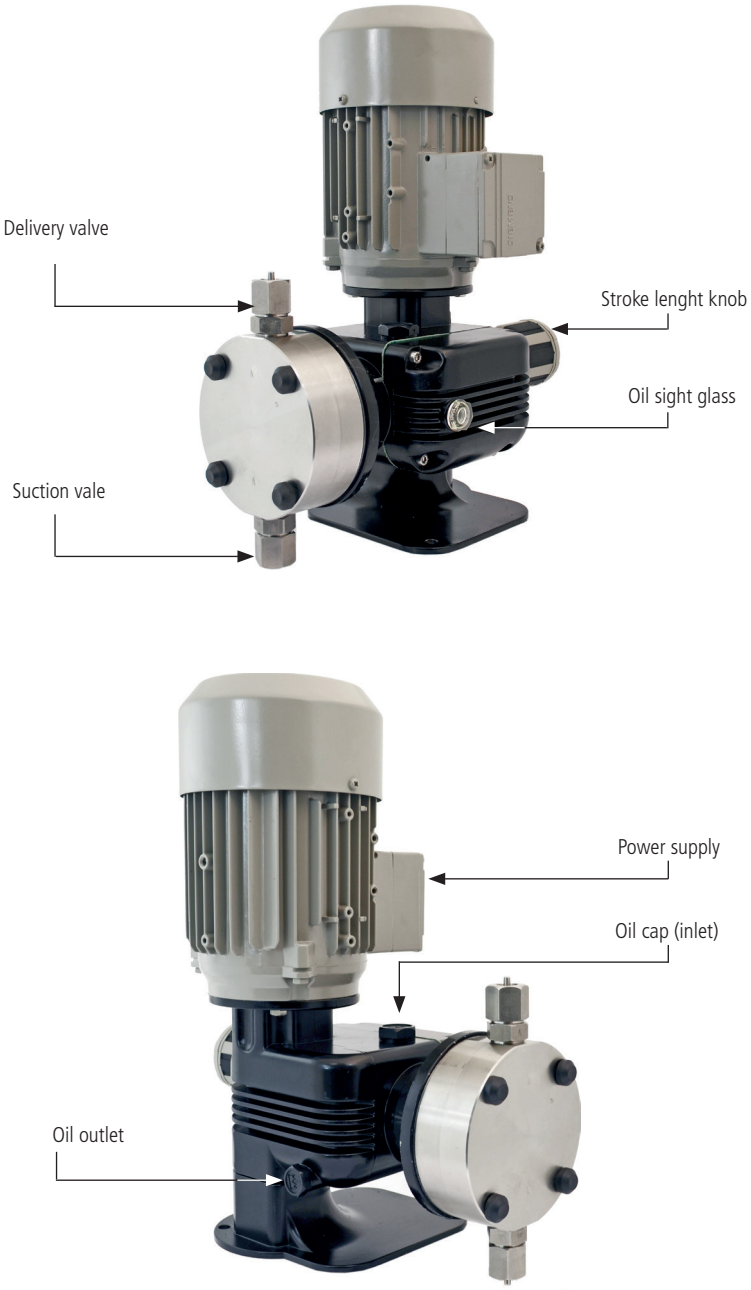
1.1 PRIUS Series

PRIUS series is a motor-driven diaphragm series pumps with spring return mechanism.
The mechanical diaphragm produces the flow thanks to the suction and delivery valves on the pump head
PRIUS is a constant dosing pump.
Flow rate is determined by the stroke length. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob.

Some functions described into this manual may need accessories not included into the pump packaging.

PLEASE DO NOT TRASH PACKAGING. IT CAN BE USED TO RETURN THE PUMP.

Fig. 1. PRIUS pump



1.3 Features

Power supply..... 220-240/380-420 V - 50 Hz 3-PHASE
..... 220/380 V - 60 Hz 3-PHASE

Aluminium enclosure
Spring return mechanism

Environment temperature: -10 - 40°C (14 - 104°F)
Chemical temperature with SS pump head: -10 - 90°C (14 - 194°F)*

Installation class II
Audible noise.....78 dbA (± 5 dB)
Protection degree.....IP 55
Max suction height.....3 m
Oil capacity.....0,3 lt (Refer to "Lubricant type" table)

* The specified temperature can be exceeded temporarily (max 15') for sterilization or flushing with hot water.

Stainless Steel pump does not fit installation kit.

Tab. 1. Diaphragm replacement

LIQUID ENDS				
CODE	Pump head	O-ring	Valve	Chemical temperature
			Balls	
S	SS	FKM B or EPDM	Stainless steel	0-90°C (32-164°F)

1.3.1 Diaphragm

To prevent damages due to diaphragm rupture, replace the diaphragm according to the use as on the table below.

SUGGESTED REPLACEMENT FOR 24H WORKING PUMP	
PTFE	10.000 operating hours (24h)

Tab. 2. Reduction factor for different site altitudes.

Site altitude above sea level	Site altitude above sea level coolant temperature		
m	<30 °C	30 °C ... 40 °C	45 °C
1000	1,07	1	0,96
1500	1,04	0,97	0,93
2000	1	0,94	0,9
2500	0,96	0,9	0,86
3000	0,92	0,86	0,82
3500	0,88	0,82	0,79
4500	0,82	0,77	0,74

Tab. 3. PRIUS D ATEX - 50 Hz; Power supply 230 VD / 400 VY, 50 Hz

PRIUS D 50Hz - ATEX GAS

PRIUS D 50Hz	Pressure bar	Capacity l/h	stroke length	Stroke/1'	Motor	HOSES CONNECTION AISI 316L	pump head
010060	10	60	3 mm	175	0,25 kW	R1/2" G1/2"	NM
010030		30		94			
010024		24		70			
010012		12		35			
010016	10	16	4 mm	35	0,25 kW	R1/2" G1/2"	
010105	10	105	3 mm	175	0,37 kW	R3/4" G3/4"	TM
010056		56		94			
010042		42		70			
010021		21		35			
007160	7	160	4 mm	175	0,37 kW	R3/4" G3/4"	
007086		86		94			
007064		64		70			
007032		32		35			
005240	5	240	6 mm	175	0,37 kW	R3/4" G3/4"	
005128		128		94			
005096		96		70			
005048		48		35			

PRIUS D 50Hz - ATEX DUST

PRIUS D 50Hz	Pressure bar	Capacity l/h	stroke length	Stroke/1'	Motor	HOSES CONNECTION AISI 316L	pump head
010060	10	60	3 mm	175	0,29 kW	R1/2" G1/2"	NM
010030		30		94			
010024		24		70			
010012		12		35			
010016	10	16	4 mm	35	0,29 kW	R1/2" G1/2"	
010105	10	105	3 mm	175	0,43 kW	R3/4" G3/4"	TM
010056		56		94			
010042		42		70			
010021		21		35			
007160	7	160	4 mm	175	0,43 kW	R3/4" G3/4"	
007086		86		94			
007064		64		70			
007032		32		35			
005240	5	240	6 mm	175	0,43 kW	R3/4" G3/4"	
005128		128		94			
005096		96		70			
005048		48		35			

Tab. 4. PRIUS D_ATEX gas_220 VD/380 VY, 60Hz , 50Hz-power

PRIUS D 60 Hz / 8							
PRIUS D 60 Hz	**Pressure bar**	**Capacity l/h**	**stroke length**	**stroke/1'**	**Motor**	**HOSES CONNECTION**	**PUMP HEAD**
						AISI 316L	**AISI 316L**
010055	10	55	3 mm	175	0,29 kW	R1/2" G1/2"	NM
010027		27		87			
010014		14		44			
010100	10	100	3 mm	175	0,43 kW	R3/4" G3/4"	TM
010050		50		87			
010025		25		44			
007150	7	150	4 mm	175	0,43 kW	R3/4" G3/4"	
007075		75		87			
007037		37		44			
005230	5	230	6 mm	175	0,43 kW	R3/4" G3/4"	
005115		115		87			
005057		57		44			

Tab. 5. PRIUS D_ATEX dust_220 VD/380 VY, 60Hz , 50Hz-power

PRIUS D 60 Hz / ATEX DUST							
PRIUS D 60 Hz	**Pressure bar**	**Capacity l/h**	**stroke length**	**stroke/1'**	**Motor**	**HOSES CONNECTION**	**PUMP HEAD**
						AISI 316L	**AISI 316L**
010055	10	55	3 mm	175	0,29 kW	R1/2" G1/2"	NM
010027		27		87			
010014		14		44			
010100	10	100	3 mm	175	0,43 kW	R3/4" G3/4"	TM
010050		50		87			
010025		25		44			
007150	7	150	4 mm	175	0,43 kW	R3/4" G3/4"	
007075		75		87			
007037		37		44			
005230	5	230	6 mm	175	0,43 kW	R3/4" G3/4"	
005115		115		87			
005057		57		44			

Tab. 6. PRIUS D AP_ATEX GAS_ 230 VD /400 VY, 50 Hz

PRIUS D AP 50Hz / ATEX GAS							
PRIUS D AP 50Hz	Pressure bar	Capacity l/h	stroke length	Stroke/1'	Motor	HOSES CONNECTION	PUMP HEAD
						AISI 316L	AISI 316L
100004	100	4	1.5 mm	175	0,37 kW	3/8"	L1
100002		2		94			
1001,5		1,5		70			
050017	50	17	2 mm	175	0,37 kW	1/2"	M1
050009		9		94			
050005		5		70			
05002,5		2,5		35			
030028	30	28	2 mm	175	0,37 kW	1/2"	N
030015		15		94			
030010		10		70			
030005		5		35			
030076	30	76	4 mm	175	0,37 kW	1/2"	S
030041		41		94			
030030		30		70			
030015		15		35			
020146	20	146	6 mm	175	0,37 kW	3/4"	T
020078		78		94			
020057		57		70			
020028		28		35			

Tab. 7. PRIUS D AP_ATEX DUST 230 VD /400 VY, 50 Hz

PRIUS D AP 50Hz / ATEX DUST							
PRIUS D AP 50Hz	Pressure bar	Capacity l/h	stroke length	Stroke/1'	Motor	HOSES CONNECTION	PUMP HEAD
						AISI 316L	AISI 316L
100004	100	4	1.5 mm	175	0,37 kW	3/8"	L1
100002		2		94			
1001,5		1,5		70			
050017	50	17	2 mm	175	0,37 kW	1/2"	M1
050009		9		94			
050005		5		70			
05002,5		2,5		35			
030028	30	28	2 mm	175	0,37 kW	1/2"	N
030015		15		94			
030010		10		70			
030005		5		35			
030076	30	76	4 mm	175	0,37 kW	1/2"	S
030041		41		94			
030030		30		70			
030015		15		35			
020146	20	146	6 mm	175	0,37 kW	3/4"	T
020078		78		94			
020057		57		70			
020028		28		35			

Tab. 8. PRIUS D AP_ATEX GAS/DUST 220 VD / 380 VY , 60 Hz

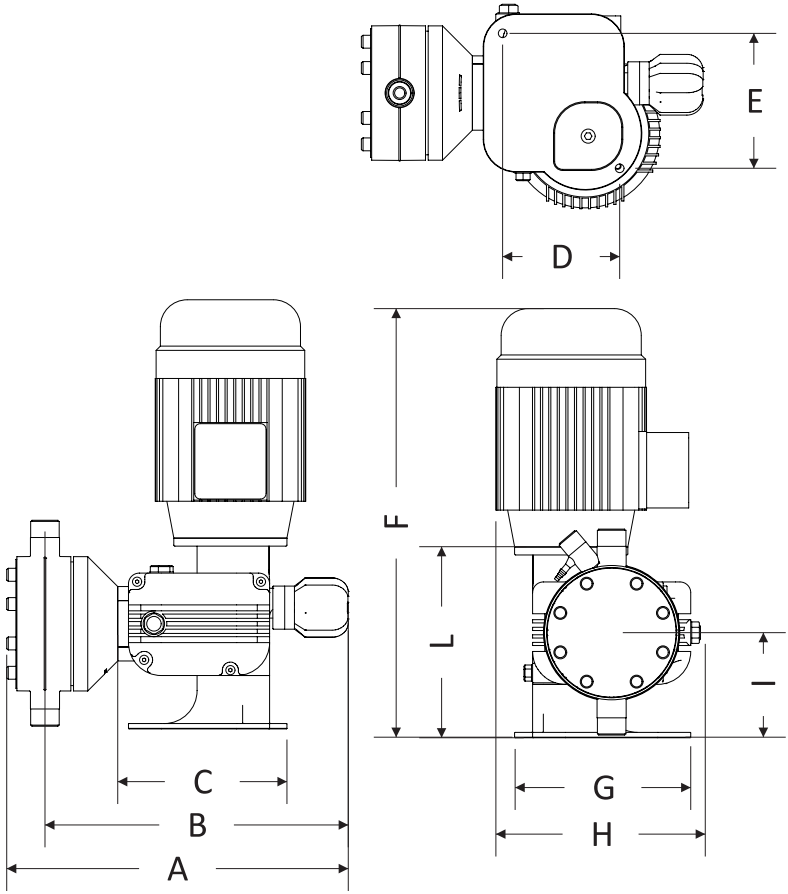
PRIUS D AP 60Hz

PRIUS D AP 60Hz	Pressure bar	Capacity l/h	stroke length	Stroke/1'	Motor	HOSES CONNECTION	PUMP HEAD
						AISI 316L	AISI 316L
100003	100	3	1.5 mm	175	0,43 kW	3/8"	L1
1001,5		1,5		87			
050014	50	14	2 mm	175	0,43 kW	1/2"	M1
050007		7		87			
0503,5		3,5		44			
030026	30	26	2 mm	175	0,43 kW	1/2"	N
030013		13		87			
030006		6		44			
030072	30	72	4 mm	175	0,43 kW	1/2"	S
030036		36		87			
030018		18		44			
020138	20	138	6 mm	175	0,43 kW	3/4"	T
020068		68		87			
020034		34		44			

1.4 Dimensions

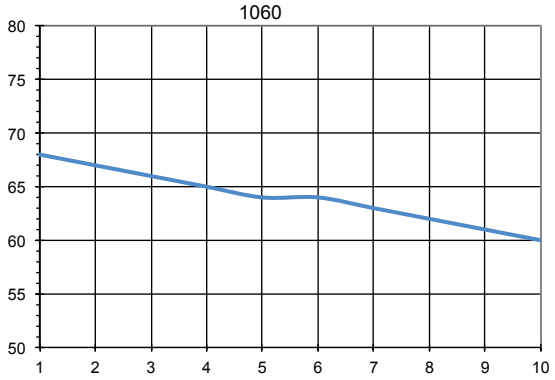
Fig. 2. Dimension

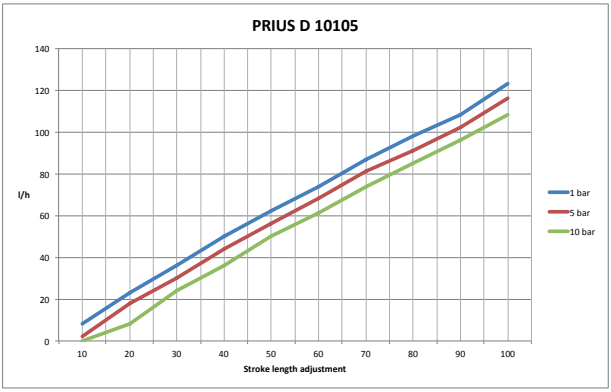
DIMENSIONS (mm)		
	NM pump head (SS)	TM pump head (SS)
A	~ 320	~ 310
B	~ 280	~ 278
C	157	157
L	177	220
G	163	163
H	~ 190	~ 190
I	97,5	110
F	~ 400	~ 460
E	125,2	125,2
D	108,6	108,6
∅ **fixing holes**	8	8

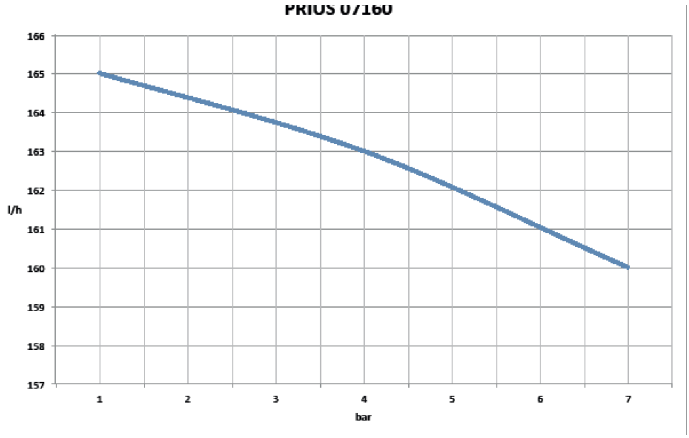


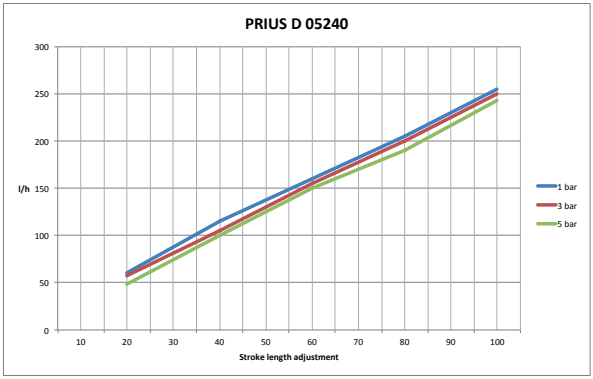
1.5 Delivery curves

Flow rate indicated is for H_2O at 20°C at the rated pressure.
Dosing accuracy ± 5% at rated pressure.






PRIUS 07160
166
165
164
163
162
161
160
159
158
157
l/h
1
2
3
4
5
6
7
bar


PRIUS D 05240
300
250
200
150
100
50
0
l/h
10
20
30
40
50
60
70
80
90
100
Stroke length adjustment
1 bar
3 bar
5 bar

2. INSTALLATION

2.1 Installation warning

Before start installation, the operator must be aware of safety precautions to prevent physical injury.

OPERATOR PROTECTION

Use safety equipment according to the company regulations.
Use this safety equipment within the work area during installation, service and when handling chemicals:

- **protective mask**
- **protective gloves**
- **safety goggles**
- **ear plugs or hear muffs**
- **further security device, if necessary.**

POWER SUPPLY DISCONNECTION

Always disconnect power to the motor before you perform any installation or maintenance tasks. Failure to disconnect power will result in serious physical injury.

INSTALLATION PUMP GUIDELINES

Install the pump
- in a safety place and fixed to the table / wall to avoid vibration problems;
- in an easy accessible place;
- in horizontal position.

Use only hoses compatibles with product to dose.

See "8.1 Chemical compatibility table" page 27.
If dosing product is not listed please consult full compatibility table or contact chemical's manufacturer.

2.2 Commissioning steps

5 steps of installation procedure:

1. Pump location
2. Oil filling
3. Piping connection
4. Electric wiring
5. Start-up

2.2.1 Pump location

Pump must be installed on a flat base at max **3 m** height from tank's bottom.
Fasten the pump by clamping screws.

Injection point must be higher of tank to avoid accidental chemical injection.

Otherwise, connect a **multifunction valve** on delivery pipeline.

2.2.2 Oil filling

Pumps are shipped WITH OIL AND WITH A BLIND CAP.
At the job site you must replace the blind cap with the one supplied. Keep the blind cap for further shipping.

Fill the oil reservoir through oil inlet ("Fig. 1. PRIUS pump" page 6).
The required amount of oil is 0,30 lt. For acceptable lubricants see the table below.
Check oil level regularly. Change the oil every 8.000-10.000 operating hours.

You must never start the pump without oil.

Tab. 9. Acceptable oil for lubricating

BRAND	LUBRICANT TYPE
MOBIL	MOBILGEAR 632
SHELL	OMALA OIL 320
BP	ENERGOL GR-XP 320
IP	MELLANA OIL 320
ESSO	SPARTAN EP 320
AGIP	BLASIA 320

2.2.3 Piping connection

Never operate any pumping system with a blocked suction and discharge. Operation, even for a brief period under these conditions, can cause motor to overheat. You must take all necessary measures to avoid this condition.

Suction piping should be as short as possible and installed in vertical position to avoid air bubbles suction.

Suction and delivery valves must be installed in vertical position.

Hand-tighten the nuts firmly.
Do not use tongs or any other tool.

Delivery hose must be firmly fixed to avoid suddenly movements that could damage near objects

2.2.4 Pump head

For priming procedure see "5. PRIMING" page 23.

It's allowed to lightly bend discharge hose.

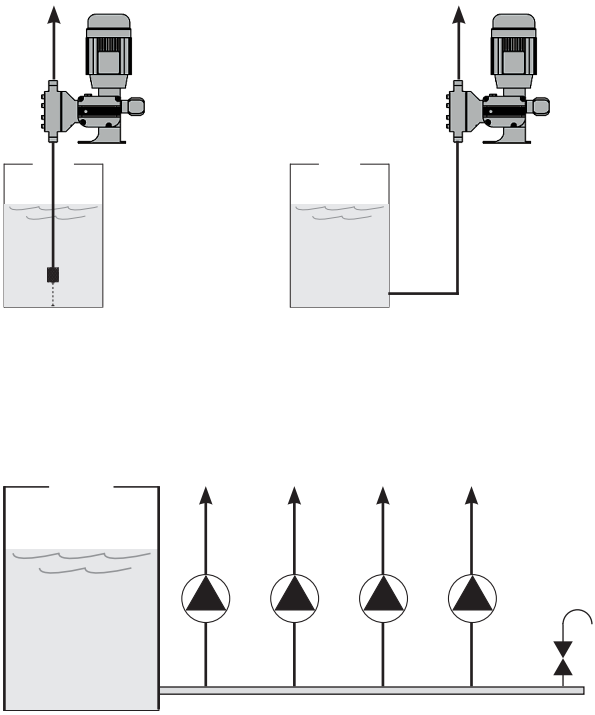
During calibration procedure ("TEST") insert discharge hose into BECKER test-tube.

2.2.5 Foot filter

Foot filter is always recommended.
Foot filter should be adequate to suction piping and installed al least 10 cm from the tank bottom.

2.2.6 Installation drawings

Fig. 3. Installation drawings



3. ELECTRICAL WIRING

3.1 Preliminary checks

⚠ The electrical wirings should be carried out by AUTHORIZED AND QUALIFIED PERSONNEL only in accordance with local regulations.

Before to proceed, verify the following steps:

1. **Verify the data on nameplate.**
   Make sure that the electrical data on the nameplate of the motor corresponds to the electrical supply.

2. **Verify the grounded power outlet.**
   The pump must be plugged to a grounded power outlet.

3. **Install a motor protection switch.**
   Pump must be connected to a motor protection switch (Residual Current Circuit Breaker - MCCB).

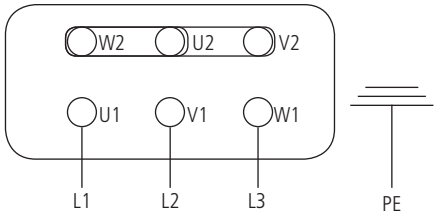
4. **Verify the cable.**
   Cable type and cross-section must be in accordance to motor data.

5. **Verify the motor rotation.**
   Start up the pump to check the motor's direction of rotation. It must comply with that indicated by the arrow marked on the motor fan cover. If the direction is reversed, rewire the motor power wires in accordance with the wiring diagram, refer to "3.2 Connection diagrams" page 20.

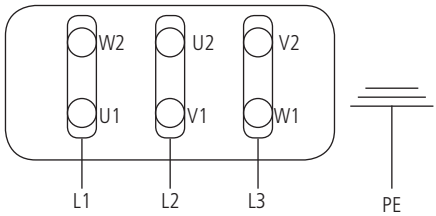
3.2 Connection diagrams

CONNECTION DIAGRAMS for 3~PHASE MOTOR 50 Hz

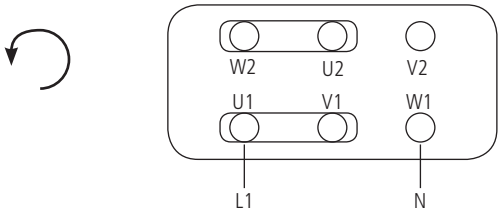
"Y" CONNECTION
380-420 Vac



"Δ" (DELTA) CONNECTION
220-240 Vac



⚠ MOTOR SUITABLE FOR INSERTIONS WITH RANGE OF AT LEAST 6" INTERVAL



4. START UP

4.1 Start up

All operation before described must be carried out before starting the pump.

1. Pump location
2. Oil filling
3. Piping connection
4. Electric wiring

Follow the **"GENERAL SAFETY GUIDELINES" PAGE 4**.

1. Start the pump at minimum pressure.
2. Turn the stroke lenght knob on 20%.
3. After 5 minutes, gradually increase the capacity until reaching the prescribed value for the operating condition.

⚠ **Control the pressure correspond to the one on the nameplate. If not, stop the pump immediatly.**

If the pump does not start to dose:
a) Stop the pump.
b) Prime the pump head ("5. PRIMING" PAGE 23)
c) Start the pump again.

4. Monitor periodically the pump functioning.

5. PRIMING

5.1 How to prime the pump

The first time and where use of the pump is suspended for a long period of time, priming may be necessary. It allows suction piping and pump head to fill with liquid before pumping against pressure.

1. Connect all pipings (suction, delivery).
2. Rotate stroke lenght knob on 100%;
3. Power the pump.
4. When the chemical starts to flow into delivery hose.
5. Proceed to standard operating condition.

Priming the pump is also recommended when there is air into pump head or into suction pipe.

6. MAINTENANCE

6.1 Maintenance schedule

Before start maitenance, the operator must be aware of safety precautions to prevent physical injury.

OPERATOR PROTECTION
Use safety equipment according to the company regulations.
Use this safety equipment within the work area during installation, service and when handling chemicals:

- **protective mask**
- **protective gloves**
- **safety goggles**
- **ear plugs or hear muffs**
- **further security device, if necessary.**

POWER SUPPLY DISCONNECTION
Always disconnect power to the motor before you perform any installation or maintenance tasks. Failure to disconnect power will result in serious physical injury.

Installation and maintenance tasks should be carried out by AUTHORIZED AND QUALIFIED PERSONNEL only in accordance with local regulations.

Before starting any maintenance or before long downtimes, drain the chemical from pump head.

Use original spare parts.

6.2 Maintenance inspection

A maintenance schedule includes these types of inspections:

- Routine maintenance and inspoections
- Three-month inspections
- Annual inspections

Shorten the inspection intervals appropriately if the pumped chemical is abrasive or corrosive.

Routine maitenance and inspections

Perform these tasks whenever you perform routine maintenance:

- Inspect the seal. Ensure that there are no leaks from the mechanical seal.
- Check electrical wiring
- Check the level and condition of the oil through the sight glass
- Check for unusual noise and vibration (noise allowed 78 dbA; ± 5 dB).
- Check the pump and piping for leaks.
- Inspect the discharge pressure.
- Check temperature (motor temperature max 70°C; pump head max 40°C)
- Check for corrosion on parts of the pump and / or on hoses.

Three-month inspections

Perform these tasks every three months:

- Check that the bolts are tight.
- Check the mechanical seal if the pump has been left idle.

Annual inspections

Perform these inspections one time each year:

- Check the pump capacity (as per nameplate).
- Check the pump pressure (as per nameplate).
- Check the pump power (as per nameplate).
- Change the oil every year (8.000-10.000 operating hours).
- Change the oil more often if there are adverse conditions

If the pump performance does not satisfy your process requirements, and the process requirements have not changed, then perform these steps:

1. Disassemble the pump.
2. Inspect it.
3. Replace worn parts.

6.3 Shutdown

Shutdown the dosing pump before any maintenance operation or before long downtimes.
Disconnect power to the motor and ensure it cannot be restarted.
Drain the chemical from pump head.
Release the pressure and disconnect the disharge pipe from the discharge valve.
Rinse the pump head and clean all valves.

7. TROUBLESHOOTING

Tab. 10. Guide to troubleshooting.

PROBLEM	CAUSE	REMEDY
Dosing pump not delivering or output too low	Suction valve leaking or blocked	Clean or replace suction valve
	Suction pipe leaking or blocked	Replace suction pipe
	Air bubbles into pump head or into suction pipe	Prime the pump as described in "5.1 How to prime the pump" page 23
	Viscosity too high	Increase the pipe diameter or contact manufacturer
	Suction lift too high	Decrease lift
	Foot filter obstruction	Clean the foot filter
Motor and pump head too hot	Wrong wiring or defecting contact	Check wiring
	Pressure too high	Install a valve
	Delivery pipe obstructed or blocked	Clean delivery pipe
	Low level oil	Refill oil
Liquid loss	Diaphragm rupture	Contact manufacturer for diaphragm replacement

If the problem can not be solved, please contac after-sales service or return the dosing pump to the manufacturer.

7.1 Repair service

Before return the dosing pump to the manufacturer Repair service, drain the chemical from pump head and rinse it.
If there is the possibility that residual corrosive liquid into pump head could cause damages, declare it on REPAIR FORM.

Remove oil and replace operating cap with the blind cap.

Complete the PRODUCT SERVICE REPAIR FORM and send it with the dosing pump.
Repair service is not accepted if PRODUCT SERVICE REPAIR FORM is missing.

8. COMPATIBILITY TABLE

8.1 Chemical compatibility table

Solenoid driven metering pumps are widely used to dose chemical fluids and it is important that the most suitable material in contact with fluid is selected for each application. This compatibility table serves as a useful help in this respect. All the informations in this list are verified periodically and believed to be correct on the date of issuance. All the informations in this list are based on manufacturer's data and its own experience but since the resistance of any material depends by several factors this list is supplied only as an initial guide, in no way manufacturer makes warranties of any matter respect to the informations provided in this list.

Tab. 11. Chemical compatibility table.

Product	Formula	Ceram.	PVDF	PP	PVC	SS 316	PMMA	Hastel.	PTFE	FPM	EPDM	NBR	PE
Acetic Acid, Max 75%	CH3COOH	2	1	1	1	1	3	1	1	3	1	3	1
Hydrochloric Acid, Concentrate	HCl	1	1	1	1	3	1	1	1	1	3	3	1
Hydrofluoric Acid 40%	H2F2	3	1	3	2	3	3	2	1	1	3	3	1
Phosphoric Acid, 50%	H3PO4	1	1	1	1	2	1	1	1	1	1	3	1
Nitric Acid, 65%	HNO3	1	1	2	3	2	3	1	1	1	3	3	2
Sulphuric Acid, 85%	H2SO4	1	1	1	1	2	3	1	1	1	3	3	1
Sulphuric Acid, 98.5%	H2SO4	1	1	3	3	3	3	1	1	1	3	3	3
Amines	R-NH2	1	2	1	3	1	-	1	1	3	3	1	1
Sodium Bisulphite	NaHSO3	1	1	1	1	2	1	1	1	1	1	1	1
Sodium Carbonate (Soda)	Na2CO3	2	1	1	1	1	1	1	1	2	1	1	1
Ferric Chloride	FeCl3	1	1	1	1	3	1	1	1	1	1	1	1
Calcium Hydroxide (Slaked Lime)	Ca(OH)2	1	1	1	1	1	1	1	1	1	1	1	1
Sodium Hydroxide (Caustic Soda)	NaOH	2	3	1	1	1	1	1	1	2	1	2	1
Calcium Hypochlor.(Chlor. ted Lime)	Ca(OCl)2	1	1	1	1	3	1	1	1	1	1	3	1
Sodium Hypochlorite, 12.5%	NaOCl + NaCl	1	1	2	1	3	1	1	1	1	1	2	3
Potassium Permanganate, 10%	KMnO4	1	1	1	1	1	1	1	1	1	1	3	1
Hydrogen Peroxide, 30% (Perydrol)	H2O2	1	1	1	1	1	3	1	1	1	3	3	1
Aluminium Sulphate	Al2(SO4)3	1	1	1	1	1	1	1	1	1	1	1	1
Copper-II-Sulphate (Roman Vitriol)	CuSO4	1	1	1	1	1	1	1	1	1	1	1	1

1 - Good resistance rating

2 - Fairly resistance rating

3- Not resistant

8.2 Materials

Polyvinyldene fluoride (PVDF) .....Pump heads, Valves, Fittings
Polypropylene (PP).....Pump heads, Valves, Fittings
Stainless steel (SS 316).....Pump heads, Valves
Polymethyl Metacrilate Acrylic (PMMA) ...Pump heads
Polytetrafluoroethylene (PTFE) .....Diaphragm
Fluorocarbon (FPM).....O-ring
Ethylene propylene (EPDM).....O-ring
Nitrile (NBR).....O-ring

PRODUCT SERVICE REPAIR FORM

ENCLOSE THE PRESENT FORM TO THE DELIVERY NOTE

DATE .....

SENDER

Company name.....
Address .....
Phone no. .....
Contact person.....

PRODUCT TYPE (see product label)

DEVICE CODE .....
S/N (serial number).....

OPERATING CONDITIONS

Location/installation description .....
.....
Chemical .....
Start-up (date) ..... Running time (approx. hours).....

REMOVE ALL THE LIQUID INTO THE PUMP HEAD AND DRY IT BEFORE PACKAGING IN ITS ORIGINAL BOX.

DESCRIPTION OF PROBLEM

☐ MECHANICAL
- Wear parts.....
- Brekage/other damages .....
- Corrosion.....
- Other.....

☐ ELECTRICAL
- Connections, connector, cables .....
- Operating controls (keyboard, display, etc.) .....
- Elettronics.....
- Other.....

☐ LEAKS
- Connections.....
- Pump head .....

☐ NOT OR INADEQUATE FUNCTION/OTHER

.....
.....
.....

I declare that the dosing pump is free of any hazardous chemical.

Signature of the compiler

Company stamp

SAFETY INSTRUCTION

N° : SN/PRIUS/ATX/17

MOTOR DRIVEN DIAPHRAGM METERING PUMP
model PRIUS

EMEC S.r.l.
Via Donatori di Sangue, 1
02100 Vazia (RI)
Tel. 0746 22841

1. Description

These safety instructions refer to the installation, use and maintenance of the PRIUS diaphragm dosing pump for use in potentially explosive atmospheres with the presence of combustible gas and vapour or particles.

You are required to follow these instructions, as well as the warnings reported in the instruction manual.

The PRIUS diaphragm dosing pump is an assembly of a motor with a diaphragm and a spring return mechanism.

The main application for this type of pump is the treatment and dosing of liquids for civil and industrial use, along with agriculture.

The PRIUS series is a range of mechanical diaphragm dosing pumps with a spring return mechanism. The movement of the diaphragm determines the flow through the inlet and outlet valves placed at the infeed and outfeed of the pump body. The PRIUS series is used for constant dosing. The capacity is adjusted from 0 to 100% through the stroke length control knob, which adjusts the volume of a single injection.

As part of the membrane or diaphragm is subject to considerable stress, it has structural characteristics in order to withstand mechanical and chemical stress. It is designed to operate without any tear, wear and anything else that might prevent the pump from operating correctly. This is one of the most important components of the pump. The diaphragm is entirely made of PTFE.

The pump is painted with epoxy paint to ensure a coating on metal items that protects them over time. The thickness of the hardened film is usually 60-80 microns.

The lantern pump body is the part where the diaphragm or membrane is located and the pump body will be assembled on it. On the side with the coupling to the rest of the mechanics box, the lantern features the piston-holder slide, which contains the lip seal and Teflon bushings. The lantern is die cast and later placed back into the machine for the necessary processing to ensure it can be used, including the creation of the pocket for the lip seal's housing.
The Gear housing box contains the bearing seats for the eccentric shaft and the worm screw shaft.
The side plug features the bearing seat for the eccentric shaft and the threaded hole for the assembly of the oil level plug.

The entire gear and all mechanical parts operate in an oil bath.

⚠ **DANGER! Never run the pump with empty pump head.**
Empty pump head can cause potential triggering in explosive atmosphere.
If pump head is empty, **prime the pump**.

2. Marking

For zone 2

II 2G Ex h IIB T3, T4 Gc
Tech File: PRIUS/ATX/17

II = ... unit II (surface)
2 = ... category 2 (zone 2)
G = ... explosive atmosphere with gas or vapour
Ex h = ... ref. new EN 80079-36/37
IIB = ... gas group (IIB)
T3,T4 = ... temperature class (T3 or T4)
Gc = ... equipment protection level
Tech File = ... name of the technical file deposited c/o IMQ

For zone 22

II 2D Ex h IIIC T125°C, resp T135°C Dc
Tech File: PRIUS/ATX/17

II = ... unit II (surface)
2 = ... category 2 (zone 22)
D = ... explosive atmosphere with particles
Ex h = ... ref. new EN 80079-36/37
T125°C, T135°C= ..... maximum surface temperature (T125°C, T135°C)
Dc ..... equipment protection level
Tech File ..... name of the technical file deposited c/o IMQ

CORRESPONDENCES BETWEEN DANGER ZONES, SUBSTANCES AND CATEGORIES ACCORDING TO DIRECTIVE 2014/34/UE

Substance Danger zone Categories
Gas, vapour or mist ..... Zone 0 1G
Gas, vapour or mist ..... Zone 1 2G or 1G
Gas, vapour or mist ..... Zone 2 3G, 2G or 1G
Particles ..... Zone 20 1D
Particles ..... Zone 21 2D or 1D
Particles ..... Zone 22 3D, 2D or 1D

3. Safety instructions for installation in a danger zone

Read the instructions in the instruction manual before installation.

All work must be performed by trained and qualified personnel. Different uses or additional uses in relation to the Use and Maintenance Manual are not allowed.

The PRIUS diaphragm dosing pump must be installed and maintained in accordance with system and maintenance standards for areas classified against a risk of explosion due to gas and vapour or particles (for example: EN 60079-14, EN 60079-17, or other national standards/regulations).

All electrical and mechanical equipment installed on the pump must undergo a separate ATEX conformity assessment in accordance with applicable European standards and feature a marking in line with the classification of the installation area (category 3G or 3D)
For the safety aspects relating to the use of the individual electrical and non-electrical components installed on the pump, please see the respective use and maintenance manuals and related safety instructions.
Electrical components/equipment must not be opened when they are powered on.

The PRIUS diaphragm dosing pump must be earthed via the anti-loosening and anti-rotation device.

Make sure that the earthing of the dosing pump is guaranteed over time.

The entire gear and all mechanical parts operate in an oil bath.
Caution: operating the pump with no liquid or under cavitation conditions will result in overheating.
In the case of operating conditions that might create temperatures close to the maximum allowed, we recommend using temperature sensors to block operation.

Periodically check the oil level inside the diaphragm dosing pump through the designated visual level inspection area

The control panel of the diaphragm dosing pump must be installed in a SAFE AREA

The user is responsible for checking the compatibility of the control panel with the electric motors of the pump.
Namely, the user must follow the instructions in the motor's manual and safety rule relating to installation in areas where an explosion hazard exists.
The connections must be made using cable entries or conductors consisting of cables fitted in a tube, both compliant with EN 60079-14.

For use in classified areas due to the presence of combustible particles:

- proceed with regular cleaning to avoid the formation of layers of particles exceeding 5mm; use suitable equipment to classify the zone.

The user must take all adequate measures to avoid risks associated with electrostatic charges (e.g.: effectiveness of earthing connections, antistatic floors, etc.). To avoid hazards associated with the formation of electrostatic charges, the piping con-

nected to the process must be manufactured with metal or antistatic material. Ensure electrical continuity between all metal parts of the pump and the rest of the installation.

The user must periodically check the following, according to the kind of use and substances used:

- the state of wear and the correct operation of the PRIUS diaphragm dosing pump;
- the presence of vibrations and/or unusual noises. If this event, stop the pump, identify the causes and contact the manufacturer.

Nevertheless, there may be residual risks during the normal operation of the PRIUS diaphragm dosing pump if:

- it does not undergo the regular maintenance plans reported in the use and maintenance manual;
- is not used as specified in the project specifications.

Different uses or additional uses in relation to the Use and Maintenance Manual are not allowed. EMEC shall not be responsible for any damage associated with unintended uses.

All maintenance operations must be carried out as specified in the use and maintenance manuals: no electrical and mechanical modification is allowed without the prior written permission from EMEC

Unauthorised replacements or replacements with non-original parts will impair the safety of the PRIUS diaphragm dosing pump. All spare parts must be requested from EMEC

4. Installation example

5. Example of EC/ATEX declaration

For zone 2

DICHIARAZIONE CE DI CONFORMITÀ
EC Declaration of Conformity

Noi ..... EMEC s.r.l.
We ..... Via Donatori di Sangue, 1
VAZIA (RI) - ITALY

dichiariamo sotto la nostra esclusiva responsabilità che il prodotto
we declare under our sole responsibility that the product
POMPA DOSATRICE A MEMBRANA modello PRIUS
DIAPHRAGM DOSING PUMP model PRIUS

al quale questo attestato si riferisce, è conforme alla seguente Direttiva Europea
to which this declaration refers, is in conformity with the following European Directive

Directive 2014/34/UE (ATEX)

.....

La conformità è stata verificata in base dei requisiti delle norme o dei documenti normativi riportati nel seguito:
The conformity are under observance of the following standards or standards documents:

- EN 1127-1 :2011
- EN 13463-1 : 2009
- EN 13463-5 : 2011

Marcatura / marking

CE Ex II 3G Ex h IIB T3, T4 Gc

Fascicolo tecnico / Technical File: PRIUS/ATX/17

Rieti, 22/06/2017.....

.....

EMEC s.r.l
Firma del legale rappresentante
Legally binding signature

Per zona 22

DICHIARAZIONE CE DI CONFORMITÀ
EC Declaration of Conformity

Noi ..... EMEC s.r.l.
We ..... Via Donatori di Sangue, 1
VAZIA (RI) - ITALY

dichiariamo sotto la nostra esclusiva responsabilità che il prodotto
we declare under our sole responsibility that the product
POMPA DOSATRICE A MEMBRANA modello PRIUS
DIAPHRAGM DOSING PUMP model PRIUS

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Directive 2014/34/UE (ATEX)

.....

La conformità è stata verificata in base dei requisiti delle norme o dei documenti normativi riportati nel seguito:
The conformity are under observance of the following standards or standards documents:

- EN 1127-1 :2011
- EN 13463-1 : 2009
- EN 13463-5 : 2011

Marcatura / marking

CE Ex II 2D Ex h IIIC T125°C, resp T135°C Dc

Fascicolo tecnico / Technical File: PRIUS/ATX/17

Rieti, 22/06/2017.....

.....

EMEC s.r.l
Firma del legale rappresentante
Legally binding signature

When dismantling a pump please separate material types and send them according to local recycling disposal requirements.
We appreciate your efforts in supporting your local Recycle Environmental Program.
Working together we'll form an active union to assure the world's invaluable resources are conserved.